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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/908,727	07/20/2001	Hisashi Ohtani	740756-2328	8954

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NIXON PEABODY, LLP
401 9TH STREET, NW
SUITE 900
WASINGTON, DC 20004-2128

EXAMINER	
BOOTH, RICHARD A	

ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 12/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/908,727	OHTANI ET AL.	
	Examiner	Art Unit	
	Richard A. Booth	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 13-20, 25-27, and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhang et al., U.S. Patent 5,529,937.

Zhang et al. shows the invention as claimed including a method of manufacturing a semiconductor device comprising: forming a semiconductor film comprising silicon 304 over a glass substrate 301; forming a protective layer 308 by plasma CVD; irradiating said semiconductor film with laser light for crystallizing said semiconductor film; removing the oxide film after the irradiating step (see col. 13-line 11 to col. 14-line 3); and leveling the surface of the semiconductor film by heating in an inert hydrogen environment after the oxide removal step (see col. 17-lines 17-21).

Regarding claims 25-26, note that furnace annealing is performed prior to laser annealing (see col. 13-lines 16-18).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 21-24 and 53-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al., U.S. Patent 5,529,937 in view of Ishihara et al., U.S. Patent 5,891,764.

Zhang et al. is applied as above but fails to expressly disclose the laser light having a line-shaped cross section elongated in one direction.

Ishihara et al. discloses using a rectangle shaped laser beam (see fig. 2 and col. 4-lines 12-22). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Zhang et al. so as to have a laser with a line-shaped cross section as suggested by Ishihara et al. because Ishihara et al. teaches that such a laser shape is suitable for annealing thin film transistor active layers.

With respect to claims 53-56, Zhang et al. is applied as above but fails to expressly disclose patterning the semiconductor film into at least one semiconductor island after leveling the surface of the semiconductor film. However, a prima facie case of obviousness still exists because the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results (see In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Claims 7-12, 28-29, and 39-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al., U.S. Patent 5,529,937 in view of Wolf et al., "Silicon Processing for the VLSI Era Volume 1: Process Technology".

Zhang et al. is applied as above but fails to expressly disclose removing the oxide film using hydrofluoric acid or forming the oxide film through thermal oxidation.

Wolf et al. discloses forming oxide layers on silicon is common and forms a stable and tenuous layer on the surface (see page 198, first paragraph). Additionally, Wolf et al. discloses it is common to remove silicon oxide using hydrofluoric acid (see page 532) since the etch is selective to silicon. In view of these disclosures, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Zhang et al. so as to form the oxide film through thermal oxidation since it is common and the process is suitable to form a stable film and remove the oxide using hydrofluoric acid because such an etch is selective to the underlying silicon. With respect to the inert gas being nitrogen, the examiner takes

official notice that nitrogen is a well known inert gas that is commonly substituted for hydrogen gas.

With respect to claims 39-44, Zhang et al. and Wolf et al. are applied as above but fails to expressly disclose patterning the semiconductor film into at least one semiconductor island after leveling the surface of the semiconductor film. However, a prima facie case of obviousness still exists because the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results (see In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Claims 33-38 and 45-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al., U.S. Patent 5,529,937.

Zhang et al. is applied as above but fails to expressly disclose patterning the semiconductor film into at least one semiconductor island after leveling the surface of the semiconductor film. However, a prima facie case of obviousness still exists because the selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results (see In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946)).

Response to Arguments

Applicant's arguments filed 9/29/03 have been fully considered but they are not persuasive. Applicant argues that Zhang does not teach leveling a surface of a

semiconductor film by heating after removing an oxide film. However, as noted by the examiner, Zhang teaches at col. 17-lines 17-21 the heating process to be conducted "in a later process" and the point at which the heating process is talked about is when the metallization contacts are fabricated which is a stage much later than the oxide film removal. For these reasons, the rejection is sustained.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is (571) 272-1668. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-1782.

Richard A. Booth
Primary Examiner
Art Unit 2812